

# PATENT SPECIFICATION

Convention Date (Canada): May 31, 1941.

565,238

Application Date (in United Kingdom): Nov. 1, 1941. No. 14093/41.

Complete Specification Accepted: Nov. 2, 1944.

(Under Section 6 (1) (a) of the Patents &c. (Emergency Provisions) Act, 1940, as amended by the Proviso to Section 91 (4) of the Patents and Designs Acts, 1907 to 1942, became operative on Oct. 26, 1944.)  
Bur. Ind. Prop. Com.



## COMPLETE SPECIFICATION

### Process of and Means for Coating Buildings and other Objects, for the Purpose of Camouflage

15 FEB 1945

We, STERNSON LABORATORIES LIMITED, a Corporation organized and existing under the Laws of the Province of Ontario, whose address is Brantford, in the Province of Ontario, Dominion of Canada, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and the following statement:—

This invention relates to a process of and means for coating objects for the purpose of camouflage and is particularly applicable to protecting buildings, gun emplacements, munitions, storage tanks and like objects.

Camouflage to the eye has been successfully carried out by blending the object with its surroundings. Shadow observation has been overcome by the use of ropes, nets and the like to which green coloured fabric may be attached in patches to simulate natural foliage. For short duration camouflage, natural foliage cut from trees is satisfactory as far as detection in the visual spectrum is concerned. Known methods have not however provided permanent protection against detection by infra-red photography.

The object of the present invention is to provide a convenient and effective coating process and means for camouflaging objects of all kinds so that they may not be detected visually, by a photographic film sensitized to that part of the spectrum visible to the normal human eye, or by a photographic film sensitized to the invisible infra-red portion of the spectrum.

It is well known that the green colour found in most plant materials can be matched to the eye and to the panchromatic film by the use of suitable green paints. However in an infra-red photograph, green grass appears white or quite light, but many green paints appear black or quite dark in such photographs. Thus the usual dazzle paint camouflage is

useless when infra-red photography is used for detection.

The present applicants have found that an object is effectively camouflaged with a paint coating, the exposed or surface film of which gives proper colour rendering to the eye and to the panchromatic film and is transparent to infra-red rays, leaving the inner or base portion of the coating to reflect the infra-red rays in the required manner. That is, the object so coated appears natural to the eye and in the panchromatic film and, at the same time, appears the usual white in the infra-red photograph. The surface coating should freely permit the infra-red rays to pass through it and strike the base portion, from which they are reflected back through the surface film to reveal the base on the infra-red photograph.

The process according to the invention therefore provides a process of coating an object in order to camouflage it, using one or more compositions which are made up and applied to the object so that not only visual and panchromatic but also infra-red rays are reflected in like manner by the coated object as by its surroundings. The infra-red reflecting portion of the coating may be caused to lie largely or wholly beneath the visual and panchromatic reflecting portion which last is made sufficiently transparent to infra-red rays to permit the latter to reach the first mentioned portion and to be reflected thereby to the required extent.

In practise the object to be camouflaged may be given a base coating which contains pigment capable of producing a reflecting surface for the infra-red rays and a second or surface coating which contains pigment capable of imparting to the object its appropriate appearance to the eye and in a panchromatic film but which in spite of this is sufficiently infra-red transparent. It is to be observed that Prussian Blue readily absorbs infra-red rays, and, that on account of these rays

not being reflected thereby, surfaces coated with a paint containing this pigment appear black in infra-red photographs and it should not be used therefore, even in small quantities to vary the tint of the white or yellow paints used. Moreover aluminium paint is not desirable because of its specular reflection. Having regard to the considerations just mentioned, any white paint or paint containing pigments, such as yellow lead chromate, which reflect infra-red rays may constitute the base coat. The outer or surface coating contains pigments, such as ultramarine blue, chromium hydroxide, chlorophyll, monastral blue, phosphotungstic green or dyes of a similar colour which transmit infra-red rays.

To illustrate particular compositions of paints which may be used the following examples are given:

For the base coating:—

(a) Lead chromate 8 lbs., barytes 8½ lbs., whiting 4½ lbs., asbestine 4½ lbs., litharge 1 ounce, enamel oil 1½ gallons, raw linseed oil ¼ gallon, varsol 1½ gallons, varnish containing an oil soluble phenol-formaldehyde resin ½ gallon, driers ½ gallon.

(b) Diatomaceous earth 4 lbs., yellow iron oxide 2 lbs., lead chromate 2 lbs., varnish containing an oil soluble phenol-formaldehyde resin 1 gallon.

For the second or surface coating:—

(c) Ultramarine blue 2½ lbs., diatomaceous earth 15 lbs., aluminium stearate ½ lb., enamel oil 1 gallon, raw linseed oil 1 gallon, varsol 1½ gallons, varnish containing an oil soluble phenol-formaldehyde resin ½ gallon, driers ½ gallon.

(d) Chromium hydroxide 2½ lbs., diatomaceous earth 15 lbs., aluminium stearate ½ lb., enamel oil 1 gallon, raw linseed oil 1 gallon, varsol 1½ gallons, varnish containing an oil soluble phenol-formaldehyde resin ½ gallon, driers ½ gallon.

The term "varsol" as used herein means a petroleum distillate having a boiling range of approximately 260 to 430° F. Enamel oil is a heat-bodied linseed oil having a viscosity of about Z on the Gardner-Holt scale.

The desired results may also be obtained on sufficiently flat surfaces, and particularly for maintenance purposes, by application of one composite paint to provide both the infra-red reflecting base, as well as the infra-red transparent and colour rendering surface film. A composite paint of this character contains the pigments required, as above indicated, with extenders and flattening agents in a vehicle such that the infra-

red reflecting pigments required which are selected from those having a relatively high specific gravity, are largely able to sink to the surface of the object being coated before the paint dries, whilst the infra-red transparent pigments used which are selected from those having a relatively low specific gravity, are largely able to remain suspended in the paint coating. The following examples are given as illustrative of such a composite paint:

(1) A dark green paint made by mixing 10 gallons of paint (c) with 1 gallon of paint (a) above.

(2) A light green paint made by mixing 5 gallons of paint (c) with 1 gallon of paint (a) above.

In the production of such composite paints, best results are obtained by blending single pigment paints to obtain the correct shade, rather than by grinding all of the pigments together.

The use of this invention may be and preferably is combined with auxiliary known aids for blending the object to be protected with its surroundings and for the overcoming of shadow effects; that is, in addition to coating the object with the paint or pigments as described herein, screens, shrouding and other known means for shielding the object and for destroying shadow effects may be employed.

The idea of overlaying a coating of white or light-coloured paint with a coating of another colour in decorative painting is not of course new in itself and no claim is made to such a combination but so far as we are aware no one has conceived the idea of using multiple-layer or multiple-pigment paints as herein proposed for matching an object with its surroundings both to the eye and to a panchromatic film as well as in an infra-red photograph.

While pigments of zinc and lead have been used to make a white foundation on which other colours are overlaid; a grey-green paint has been made by mixing ultramarine blue, lemon chrome yellow, blue black and white lead; and a mountain green has been made by adding to medium chrome yellow sufficient cobalt to produce the desired hue and also adding a little white if necessary.

It has also been proposed to decorate surfaces by applying to the surface a base or groundwork of a body colour of a white or other light tint or shade made by mixing white zinc or like material with oil or varnish with or without driers and applying over the base one or more layers of transparent enamel or paint of any desired colour or colours.

A paint has also been proposed for coating concrete and like material consisting of a solution of casein and formamide in water and ammonia stirred into a mixture of zirconium oxide, lead chromate and ultramarine with linseed and castor oils.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A process of coating an object in order to camouflage it, using one or more compositions which are made up and applied to the object so that not only visual and panchromatic but also infra-red rays are reflected in like manner by the coated object as by its surroundings.

2. A process according to Claim 1 wherein an infra-red reflecting portion of the coating is caused to lie largely or wholly beneath a visual and panchromatic reflecting portion which last is made sufficiently transparent to infra-red rays to permit the latter to reach the first mentioned portion and to be reflected thereby to the required extent.

3. A process according to Claim 2 wherein the object is coated with an under film containing pigment having the necessary infra-red reflecting characteristics and with a top film which contains pigment having the necessary visual and panchromatic reflecting characteristics but which in spite of this is sufficiently infra-red transparent.

4. A process according to Claim 2 wherein the object is coated with a mixed composition containing pigment with the necessary infra-red reflecting characteristics and having a relatively high specific gravity, and pigment with the necessary visual and panchromatic reflecting characteristics and having a relatively low specific gravity, in a vehicle such that when the composition is applied to a sufficiently flat surface the heavier pigment is largely able to settle to the bottom of the coating before the latter dries, whilst the lighter pig-

ment is largely able to remain suspended above it in the dried coating which in spite of this is sufficiently infra-red transparent.

5. A process according to any preceding claim, to produce a camouflage covering suitable for surroundings of foliage, wherein infra-red reflecting pigment is used comprising at least one of a group of colours consisting of white and yellow in conjunction with visual and panchromatic reflecting pigment comprising at least one of a group of colours consisting of blue and green and which are sufficiently infra-red transparent.

6. A camouflage covering for buildings, guns and other objects resulting from carrying out the process according to any preceding claim and which comprises a base portion which reflects infra-red rays and a surface portion which is sufficiently transparent to infra-red rays but reflects visual and panchromatic rays.

7. A camouflage covering, according to Claim 6 which when observed visually and by both normal and infra-red photography suggests foliage.

8. A camouflage covering according to either of Claims 6 or 7 wherein the base portion contains at least one of a group consisting of white and yellow pigments and the surface portion contains at least one of a group consisting of green and blue pigments.

9. The process of and means for coating objects in order to camouflage them, substantially as herein described.

10. A camouflaged object whenever coated by the process or by the means according to any preceding claim and which to the eye and the panchromatic film and also to an infra-red sensitive film is substantially matched with its surroundings.

Dated the 8th day of September, 1941.  
BARKER, BRETTELL & DUNCAN,  
Chartered Patent Agents,  
75-77, Colmore Row, Birmingham, 3.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1944.

PATENTS AND DESIGNS ACTS, 1907 TO 1942  
SPECIFICATION NO. 565,238

Reference has been directed, in pursuance of Section 6, sub-section (2), of the Patents and Designs Acts, 1907 to 1942, to specification No. 563,993.

THE PATENT OFFICE.  
16th April, 1945.